



Research Paper

Travel Vaccination Knowledge, Awareness, and Practice Among Academicians: A Descriptive-cross-sectional Study



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Citation Yeşiltepe A, Yorulmaz DZ, Demirkiran BC. Travel Vaccination Knowledge, Awareness, and Practice Among Academicians: A Descriptive-cross-sectional Study. Caspian Journal of Health Research. 2023; 8(4):185-198. <https://doi.org/10.32598/CJHR.8.4.513.1>

Running Title Travel Vaccination Knowledge, Awareness, and Practice Among Academics

doi <https://doi.org/10.32598/CJHR.8.4.513.1>



ABSTRACT

Background: International travel can facilitate the geographic spread of infectious diseases. Academics are at risk of diseases because they often travel abroad for various reasons such as conferences, congresses, Erasmus, holidays, leisure, etc.

Objectives: This paper investigated travel vaccination knowledge, awareness, and practice among academicians.

Materials & Methods: This descriptive and cross-sectional study was conducted at a public university in Türkiye, between March 1 and May 31, 2022. The sample consisted of 243 academicians. Data were collected online using a personal information form and a travel vaccinations knowledge, awareness, and action questionnaire (TVKAAQ). The data were analyzed using numbers, percentages, and nonparametric tests such as Mann-Whitney U and Kruskal-Wallis H tests. The analysis was interpreted at the 95% confidence level and 0.05 error margin.

Results: Less than half of the participants were 25 to 34 years old (45.1%) and had 6 to 10 years of work experience (38.7%). Most participants never received international travel (93.4%) and vaccine consultancy (94.7%). Participants who traveled more than five times a year had a significantly higher mean TVKAAQ score than those who traveled less than five times a year. Participants who were concerned about infectious diseases had a significantly higher mean TVKAAQ score than those who were not. Participants who believed travel vaccinations are required had a significantly higher mean TVKAAQ score than those who did not. Participants who were informed about vaccines had a significantly higher mean TVKAAQ score than those who were not.

Conclusion: Academics have insufficient knowledge and awareness of travel vaccinations and rarely get them before traveling. In cooperation with the Turkish Ministry of Health and The Council of Higher Education, initiatives should be planned in the field of travel medicine for academicians.

Keywords: Academics, Travel medicine, Vaccines, Cross-sectional studies

Article info:

Received: 25 May 2023

Accepted: 25 Jul 2023

Published: 01 Oct 2023

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1. Introduction

Thanks to globalization, industrialization, and advances in technology and transportation, more people are traveling abroad every day for business, education, tourism, or religion [1]. According to the [United Nations World Tourism Organization \(UNWTO\)](#), 963 million people traveled abroad in 2022. This number is expected to increase over the years [2]. As more people travel abroad, researchers are increasingly looking at the concepts of travel health and medicine. Travel medicine provides reliable information on the epidemiology of infectious and non-infectious risks, local and regional health regulations, and vaccination requirements [3]. Travel medicine aims to keep travelers healthy and prevent illness during and after long-distance travel. Pre-travel counseling helps us identify potential risk factors and take precautions against them. It helps us educate travelers and increase their awareness of diseases. It also allows us to provide immunizations and prophylaxis for vaccine-preventable diseases. Ensuring travel safety can prevent travelers from contracting diseases and improve their quality of life during and after international travel. Pre-travel counseling is an integral part of primary health care. It is also essential for protecting, promoting, and maintaining public health [4].

International travel can facilitate the geographic spread of infectious diseases. International travelers are at significant risk for infectious diseases because they can transmit diseases from their home country to another country and/or bring diseases from another country to their home country [5]. The COVID-19 pandemic is a recent example of how international travel can increase the spread of infectious diseases and quickly become a global threat [6, 7]. By vaccinating international travelers, we can control travel-related infectious diseases nationally and internationally [8].

Academicians are university professors, associate professors, graduate students, lecturers, and research assistants [9]. They are more educated than the general public, can influence different segments of society, and act as a bridge between accurate and up-to-date information and society [6]. Academicians are at risk of diseases because they often travel abroad for various reasons (conferences, congresses, Erasmus, holidays, leisure, etc.). Researchers have investigated how aware businesspeople, tourists, and airport workers are of travel vaccinations [10-14] However, no researchers have focused on the level of awareness of travel vaccinations among academicians.

Many infectious diseases are spread geographically by international travelers. Vaccines help us keep infectious diseases under control. Due to frequent international travel, academicians are at increased risk for infectious diseases. Therefore, this study aimed to determine how much academicians know about travel vaccines, how aware they are of them, and how often they get them before traveling. We believe our findings will contribute to the literature and help government agencies develop optimal public health strategies to protect and maintain public health.

2. Materials and Methods

Research type and population

This descriptive and cross-sectional study was investigated to determine how much academicians know about travel vaccinations and how often they get them before traveling. The study population consisted of 547 academicians from [Artvin Çoruh University](#) in the 2021-2022 academic year.

The sample size was calculated using the [Equation 1](#):

$$1. n = N (t_{\alpha/2})^2 (p.q) / S^2 (N-1) + S^2 (p.q) m$$

Where N denote population size (n=550), p was the probability of the occurrence of the event of interest that was conservatively considered as 0.5, S denote sampling error equal to 5%, and t, was the theoretical value of 1.96 corresponding to a degree of freedom and estimated error level. The calculation showed that a sample of 226 would be large enough to detect significant differences [15] The sample consisted of 243 participants. Research data were collected using non-probability convenience sampling method. In this widely used method, everyone who responds to the survey included in the sample. This method was used in the research because it was easy and cheap [16]. This study included academicians who worked at [Artvin Çoruh University](#) in Turkey during the 2022-2023 academic year, and volunteered to participate in the study. Participants who didn't meet these criteria were excluded.

Data collection tools

The data were collected using a personal information form and a travel vaccinations knowledge, awareness, and action questionnaire.

Personal information form

The personal information form was based on a literature review conducted by the researchers [4, 6, 10-14]. The form consisted of two parts. The first part consisted of ten items on sociodemographic characteristics (age, gender, marital status, work experience, etc.). The second part consisted of eight items on travel-related characteristics (history of international travel, frequency of international travel, duration of travel, reason for travel, etc.).

Travel vaccinations knowledge, awareness, and action questionnaire

The travel vaccinations knowledge, awareness, and action questionnaire (TVKAAQ) was based on a literature review conducted by the researchers. The questionnaire consisted of 25 Yes-No questions about academicians' knowledge, awareness, and action regarding travel vaccinations. The questionnaire included such questions as [1] Do you check vaccination programs and travel guides in destination countries?, [3] Do you get vaccinated before you travel?, [4] Do you always have your immunization card with you?, [5] Do you get check-ups before and after you travel?, etc. "No" answers were scored "0," while "yes" answers were scored "1." The total score ranges from 0 to 25, with higher scores indicating more knowledge, awareness, and action regarding travel vaccinations. Five experts with PhD degrees in public health nursing checked the questions for intelligibility and relevance. The draft scale was presented to expert opinion in Davis technique (1=not relevant, 2=relevant to some extent, 3=relevant, 4=completely relevant) [17]. No item was removed or added from the draft scale, as the experts reported highly positive opinions about the intelligibility or responses of the scale (experts used only 3 and 4 points for each item). The questionnaire has a Kuder Richardson-20 (KR-20) score of 0.824.

Data collection

The data were collected online using [Google Forms](#). The researchers emailed all academicians a survey link, including an informed consent form. All of the study sample were briefed on the research purpose and procedure. Those who agreed to participate in the study clicked the "agreed" option and then moved on to the data collection tools. Each participant took 3-4 minutes to fill out the data collection tools. The researchers ensured that each participant filled out the data collection tools only once. The researchers evaluated all participants' questions and feedback regarding the data collection tools.

Statistical analysis

The data were analyzed using the SPSS software, version 25 at a significance level of 0.05. Mean±SD, numbers, and frequencies were used for descriptive statistics. Normality was tested. The results showed that the data were nonnormally distributed. Therefore, nonparametric tests were used for analysis. The Mann-Whitney U test was used to compare two independent groups, while the Kruskal-Wallis H test was used to compare three or more independent groups. The Bonferroni correction was used for posthoc comparisons. There was no missing data because the data were collected online. No missing data completion method was used during data analysis.

3. Results

The mean age of study participant was 36.61±7.24 years. Sociodemographic characteristics of the study participants are shown in [Table 1](#). More than half of the participants were men (55.6%). Less than half of the participants were 25 to 34 years of age and had 6 to 10 years of work experience (38.7%). Most participants were married (72%), had no chronic diseases (78.2%), and had previously traveled abroad (82.7%).

[Table 2](#) presents travel-related characteristics of the study participants. More than half of the participants travel abroad at least once a year (62.1%). Most participants were concerned about acquiring infectious diseases abroad (89.3%) and believed travel vaccination was necessary (85.6%). Less than half of the participants used the Internet to get information about travel vaccinations (47.3%).

[Table 3](#) illustrates distribution of TVKAAQ responses. The majority of participants did not receive health (93.4%) and vaccination counseling (94.7%) before traveling abroad. Only a small proportion of the participants checked the travel health manual published by the general directorate of borders and coasts (11.9%). About a quarter of the participants consulted primary healthcare professionals or travel health centers to get international travel consultancy (23.5%). Half of the participants checked the immunization programs of the destination country (50.2%). Less than half of the participants got vaccinated before traveling abroad (44.5%). Less than half of the participants had their travel vaccination cards with them when they traveled abroad (49.2%).

Table 1. Sociodemographic characteristics of the study participants (n=243)

Variables	No. (%)	Mean±SD
Age (y)	25-34	112(45.1)
	35-44	91(37.4)
	≥45	40(16.5)
Gender	Woman	108(44.4)
	Man	135(55.6)
Marital status	Married	175(72.0)
	Single	68(28.0)
Academic title	Research assistant	48(19.8)
	Instructor	69(28.4)
	Professor, Dr, faculty member	88(36.2)
	Associate professor	28(11.5)
	Professor	10(4.1)
Work experience (y)	0-5	92(37.9)
	6-10	94(38.7)
	11-15	33(13.6)
	16-20	24(9.9)
Children	Yes	139(57.2)
	No	104(42.8)
Income	High	135(55.6)
	Middle	108(44.4)
Perceived health	Good	156(64.2)
	Neither good nor bad	87(35.8)
Chronic disease	Yes	53(21.8)
	No	190(78.2)
Total	243(100)	



The TVKAAQ response distributions of the participants are given in [Table 3](#). The highest affirmative answers were related to the question 21 (before traveling internationally, one should ensure that their prescribed medicines are sufficient for the duration of the trip) (99.2%), question 13 (before traveling internationally, one should do research on health care, infectious diseases, etc. in the destination country) (97.1%), and question

17 (getting travel vaccinations before traveling internationally is important for travel health and the control of infectious diseases) (95.9%) ([Table 3](#)).

Age and gender were associated with participants' TVKAAQ scores. Participants 35 to 44 years of age (18.5 ± 3.93) had a significantly higher mean TVKAAQ score than those older than 45 years (16.3 ± 4.41)

Table 2. Travel-related characteristics of the study participants (n=243)

Variables		No. (%)
Have you ever been abroad?	Yes	201(82.7)
	No	42(17.3)
How often do you travel abroad? (year/times)	1	151(62.1)
	2-5	73(30.0)
	≥6	19(7.8)
How long do you stay abroad? (d)	1-5	80(32.9)
	6-10	115(47.3)
	11-15	26(10.7)
	16-20	15(6.2)
	≥21	7(2.9)
Are you concerned about infectious diseases abroad?	Yes	217(89.3)
	No	26(10.7)
Do you believe pre-travel vaccination is necessary?	Yes	208(85.6)
	No	24(9.9)
	No idea	11(4.5)
Where do you get your information about travel vaccinations?	No information	36(14.8)
	Primary care professionals	15(6.2)
	Internet	115(47.3)
	Ministry of Health	70(28.8)
	Directorate general of the border and coastal health	70(2.9)
Why do you travel abroad?	Education	97(39.9)
	Entertainment, tourism	66(27.2)
	Other	80(32.9)
Total		243(100)

($P=0.04$). Female participants (18.8 ± 2.86) had a significantly higher mean TVKAAQ score than their male counterparts (17.0 ± 4.10) ($P=0.01$). Marital status, academic title, work experience, income, perceived health, presence of children, and presence of chronic diseases were not associated with our participants' TVKAAQ scores (Table 4).

Participants who traveled abroad more than five times a year had a significantly higher mean TVKAAQ score than those who traveled abroad once a year ($P=0.02$). Participants who were concerned about infectious diseases abroad had a significantly higher mean TVKAAQ score than those who were not ($P<0.02$). Participants who believed pre-travel vaccination was necessary had a significantly higher mean TVKAAQ score than those who did not believe pre-travel vaccination was neces-

Table 3. The distribution of travel vaccinations knowledge, awareness, and action (TVKAAQ) responses

TVKAAQ Items		No. (%)	
1	Have you received health counseling before traveling internationally?	Yes	16(6.6)
		No	227(93.4)
2	Have you received advice on vaccinations before traveling internationally?	Yes	13(5.3)
		No	230(94.7)
3	Have you reviewed the travel health handbook published by the General Directorate of Borders and Coasts before traveling internationally?	Yes	29(11.9)
		No	214(88.1)
4	Do you do research on the destination country before traveling internationally?	Yes	234(96.3)
		No	9(3.7)
5	Do you check the travel guide of the destination country before traveling internationally?	Yes	212(87.2)
		No	31(12.8)
6	Do you do research on the vaccination and immunization program of your destination country before traveling internationally?	Yes	122(50.2)
		No	121(49.8)
7	Have you received the travel vaccinations recommended by the destination country?	Yes	108(44.4)
		No	135(55.6)
8	Do you carry your vaccination card with you when traveling?	Yes	120(49.4)
		No	123(50.6)
9	Do you seek information from a primary health care provider or travel health center before traveling internationally?	Yes	57(23.5)
		No	186(76.5)
10	Do you do research about health care, infectious diseases, etc. in the destination country before traveling internationally?	Yes	149(61.3)
		No	94(38.7)
11	One should have a health check before traveling internationally.	Yes	193(79.4)
		No	50(20.6)
12	It is important for travel health to receive health protection and promotion counseling before traveling internationally.	Yes	222(91.4)
		No	21(8.6)
13	Before traveling internationally, one should do research on health care, infectious diseases, etc. in the destination country.	Yes	236(97.1)
		No	7(2.9)
14	Before traveling internationally, one should review the travel guide of the destination country.	Yes	220(90.5)
		No	23(9.5)
15	It is important for travel health to get travel vaccinations recommended by the destination country before traveling internationally.	Yes	215(88.5)
		No	28(11.5)
16	Before traveling internationally, one should be familiar with the destination country's travel vaccination and immunization program.	Yes	217(89.3)
		No	26(10.7)

TVKAAQ Items		No. (%)	
17	Getting travel vaccinations before traveling internationally is important for travel health and the control of infectious diseases.	Yes	223(95.9)
		No	10(4.1)
18	It is important for travel health to seek advice on travel vaccinations before traveling internationally.	Yes	216(88.9)
		No	27(11.1)
19	Before traveling internationally, one should prepare a travel medical kit.	Yes	193(79.4)
		No	50(20.6)
20	Getting travel vaccinations before traveling internationally is critical for health protection and control of infectious diseases.	Yes	223(91.8)
		No	20(8.2)
21	Before traveling internationally, one should ensure that their prescribed medicines are sufficient for the duration of the trip.	Yes	241(99.2)
		No	2(0.8)
22	One should carry their travel vaccination card with them when traveling internationally.	Yes	206(84.8)
		No	37(15.2)
23	One should have a health check after traveling internationally.	Yes	204(84.0)
		No	39(16.0)
24	When traveling internationally, one should carry the prescriptions/reports of their medicines.	Yes	226(93.0)
		No	17(7.0)
25	It is important for travel health to receive health protection and promotion counseling after traveling internationally.	Yes	223(91.8)
		No	20(8.2)



sary and those who had no idea about it ($P<0.001$). Participants who received information about travel vaccination had a significantly higher mean TVKAAQ score than those who had no idea about travel vaccination ($P<0.001$). Having been abroad before, duration of travel, and reasons for travel did not associate with participants' TVKAAQ scores (Table 5).

4. Discussion

This study assessed knowledge, awareness, and behavior regarding travel vaccination among academicians. The results showed that participants aged 35 to 44 (18.5 ± 3.93) had a significantly higher mean TVKAAQ score than those older than 45. Akodu et al. [1] found that Nigerian travelers aged 51 to 60 had more positive attitudes toward travel vaccinations than their younger counterparts. Zhang et al. [18] also reported that older Chinese travelers were more aware of and had more positive attitudes toward travel vaccinations than their

younger counterparts. These findings may be related to many young people engaging in risky behaviors because they believe nothing can harm them. On the other hand, older adults take more preventive health measures to avoid infectious diseases [19, 20]. People who travel abroad are at increased risk of infection, depending on the season, location, activities, and travel duration. Therefore, governments should inform all international travelers, regardless of age, about travel vaccinations according to the destination country's current conditions and official procedures. In addition, primary care providers should inform patients that travel vaccinations are available and that they can receive them at least 4-6 weeks before travel. In other words, healthcare professionals should raise public awareness about travel vaccinations to increase vaccination rates [18, 20-22].

Female participants had a significantly higher mean TVKAAQ score than their male counterparts. Akodu et al. [1] found that women had more positive attitudes to-

Table 4. The distribution of TVKAAQ scores by sociodemographic characteristics (n=243)

Variables		Mean±SD	Median	U**/KW***	P
Age (y)***	25-34 (1)	17.7±3.05	18	11.096	0.04 2>3
	35-44 (2)	18.5±3.93	19		
	≥45 (3)	16.3±4.41	17.5		
Gender**	Woman	18.8±2.86	18	5901.00	0.01
	Man	17.0±4.10	18		
Marital status**	Married	17.5±3.93	18	5642.00	0.529
	Single	18.5±2.99	18		
Academic title***	Research assistant	18.3±3.13	18.5	3.805	0.433
	Instructor	17.6±3.42	18		
	Professor, Dr, faculty member	17.9±3.99	19		
	Associate professor	17.6±2.81	17		
	Professor	15.3±6.54	18		
Work experience (year)***	0-5	18.3±3.00	18.5	4.700	0.195
	6-10	17.6±3.78	19		
	11-15	18.0±4.21	18		
	16-20	16.0±4.68	16.5		
Children**	Yes	17.5±4.18	18	7220.50	0.989
	No	18.2±2.92	18		
Income**	High	18.1±3.81	18	6411.00	0.105
	Middle	17.3±3.54	18		
Perceived health**	Good	17.6±3.68	18	6264.00	0.318
	Neither good nor bad	18.0±3.75	19		
Chronic diseases**	Yes	18.2±4.20	19	4534.00	0.266
	No	17.7±3.56	18		

SD: Standard deviation. **Mann Whitney U, ***Kruskal Wallis.



ward travel vaccinations than men. Farnham et al. [19] reported that Thai male travelers engaged in more risky behaviors than their female counterparts. On the other hand, Zhang et al. [18] found that Chinese male travelers had more positive attitudes toward travel vaccinations than their female counterparts. Infectious diseases and travel-related illnesses affect both sexes and reduce their quality of life. Researchers recommend that authorities provide travel vaccination counseling to all men and

women and inform people about health protection and promotion, vaccines, and other preventive health behaviors during and after travel [18, 21, 23].

Participants who traveled abroad more than five times a year had a significantly higher mean TVKAAQ score than those who traveled abroad once yearly. Suess et al. [24] reported that people with high travel frequency were more likely to engage in preventive health behaviors, in-

Table 5. The distribution of TVKAAQ scores by travel-related characteristics (n=243)

Variables		Mean±SD	Median	KW/U	p
Have you ever been abroad?*	Yes	17.8±3.77	18	3778.50	0.283
	No	17.7±3.43	18		
How often do you travel abroad? (year/times)**	1 (1)	17.2±3.89	18	7.786	0.020*
	2-5 (2)	18.3±3.19	18		
	≥6 (3)	19.8±3.13	20		
How long do you stay abroad? (day)**	1-5	16.8±4.38	17	4.508	0.342
	6-10	18.3±3.28	19		
	11-15	18.3±2.65	18		
	16-20	17.7±4.31	20		
	≥21	17.2±2.28	18		
What is the overall time between your travel planning and travel time duration? (d)**	1-5 (1)	14.1±4.82	17	31.024	0.001* 4>1, 2>1, 3>1 2>4, 3>4, 2>3
	6-10 (2)	21.0±2.51	22		
	11-15 (3)	20.8±1.16	21		
	16-20 (4)	17.8±3.38	18		
Are you concerned about infectious diseases abroad?*	Yes	18.0 3.47	18	2061.00	0.024*
	No	15.6±4.81	17		
Do you believe pre-travel vaccination is necessary?***	Yes	18.6±3.07	19	52.102	0.001* 1>2, 1>3
	No	12.0±3.75	12		
	No idea	15.5±2.38	16		
Where do you get your information about travel vaccinations?***	No information (1)	14.3±3.31	15	53.013	0.001* 3>1, 4>1, 2>1, 5>1 5>3, 5>4
	Primary care professionals (2)	19.8±3.37	20		
	Internet (3)	17.8±3.61	19		
	Ministry of Health (4)	18.6±2.86	19		
	Directorate general of the border and coastal health (5)	22.4±1.81	22		
Why do you travel abroad?***	Education	18.04±3.30	18	0.755	0.686
	Entertainment	17.54±4.29	19.5		
	Other	17.75±3.69	18		

Note: the numbers in the parenthesis are shown for pair wise comparison.



*Mann Whitney U, ***Kruskal Wallis.

cluding vaccine-seeking behaviors. Pedersini et al. [25] found that frequent travelers were more likely to receive hepatitis A and hepatitis B vaccines than infrequent travelers. This is likely due to the fact that frequent travelers are more likely to accept vaccines because they seek more preventive health services to protect themselves from infectious diseases [18, 24]. International travel increases the risk of infectious diseases. Greater human mobility increases the incidence and reach of infectious diseases. Therefore, public authorities should provide international travelers with more travel counseling and medicine interventions [26]. Travelers are vulnerable to oral-fecal-transmitted diseases because they frequently eat out, use public toilets (airports, terminals, ships, etc.),

and spend hours indoors (waiting rooms, lounges, vehicles, etc.). Therefore, authorities should inform them about hygiene measures and travel vaccinations to protect and maintain their health. We should take the following measures to increase travel vaccination rates in the community. First, we should provide information about travel vaccinations during online ticket purchase/reservation. Second, we should hang posters about travel immunization at transportation points such as airports and bus terminals. Third, primary healthcare professionals should distribute travel vaccine leaflets [14, 18, 21].

Participants who believed travel vaccination was necessary had a significantly higher mean TVKAAQ score than those who did not. Akodu, Ogbu, and Abiola (2019) found that Nigerian travelers had positive attitudes toward travel vaccinations [1]. This finding stems from the fact that people who believe that preventive health practices are necessary and effective are more likely to adopt healthy lifestyle behaviors and get vaccinated [18]. Vaccination is an effective way to protect and promote health and prevent disease. Vaccination prevents 100-150 million deaths annually and significantly reduces economic losses and disability [27]. Therefore, authorities should inform all age groups about the importance and effectiveness of all vaccines in protecting and promoting health and preventing disease [27, 28]. They should raise public awareness that international travel is a risk factor for the transmission and spread of infectious diseases and that pre-travel health counseling and vaccination allow us to maintain quality of life and improve public health. The [Turkish Ministry of Health](#) should prepare public service announcements and broadcast them in the mass media to increase travel vaccination rates [21, 22].

Participants who were concerned about infectious diseases abroad had a significantly higher mean TVKAAQ score than those who were not. Bravo et al. [29] found that German travelers who underestimated the risk of diseases were less likely to be vaccinated. On the other hand, Poulos et al. [30] found that German travelers who perceived the risk of disease were more likely to be vaccinated. Heywood et al. [31] reported that Australian students who were not concerned about health threats were less likely to receive pre-travel health advice. These findings suggest that people with high illness perception and anxiety about infectious diseases are more likely to engage in preventive health behaviors [30, 32]. Infectious diseases affect all segments of society, increasing healthcare costs and leading to disability and death [33]. Pre-travel health and immunization counseling helps protect people from illnesses during and after travel. In this context, authorities should inform the public about the importance of health and immunization counseling before international travel. They should provide information on how to protect themselves against diseases that are likely to occur during travel. They should post leaflets on planes, buses, trains, etc. to inform travelers about international pre-travel health counseling, travel vaccinations, and general precautions about infectious diseases [21]. In addition, travelers should visit the official website of the General Directorate of Borders and Coastlines of the Ministry of Health to learn about travel vaccinations, infectious diseases, and health services in destination countries [22].

Participants who received information about travel vaccination had a significantly higher mean TVKAAQ score than those who did not. Heywood et al. [8] conducted research in seven countries and concluded that the main reason for low vaccination rates and negative attitudes toward vaccines was a lack of knowledge. Alqahtani et al. [34] found that Australian pilgrims who received travel health advice were twice as likely to be vaccinated. Heywood et al. [8] reported that travelers who consulted health professionals before traveling were more likely to be vaccinated against hepatitis A/A-B. These findings suggest that travelers who are knowledgeable about travel health and vaccinations are more likely to engage in preventive health behaviors and receive vaccinations before traveling abroad [34, 35]. By providing travelers with travel health and vaccination counseling, we can increase their awareness of infectious diseases and travel vaccinations, resulting in higher vaccination rates. The Turkish Ministry of Health should broadcast public service announcements about travel immunizations. Official organizations ([World Health Organization \(WHO\)](#), [Turkish Ministry of Health](#), etc.) should share information about travel vaccinations on their social media platforms. Primary healthcare facilities should have posters and brochures on travel vaccinations. Healthcare professionals should inform the public about travel vaccinations [21, 22]. Universities should also send reminder cards and messages to academicians about travel vaccinations.

Marital status, academic title, work experience, income, perceived health, presence of children, and presence of chronic diseases did not affect our participants' TVKAAQ scores. Poulos et al. [30] found that business travelers were more likely to be vaccinated. Wang et al. [35] reported that backpackers were less likely to be vaccinated. Akodu et al. [1] found that married and single Nigerian travelers had similar attitudes toward travel vaccination. On the other hand, Poulos et al. [30] documented that German travelers who were married or living with their partners were more likely to receive travel vaccinations than their single counterparts. Hassan and Afolaranmi [36] found that Nigerian physicians who were aware of travel vaccinations were more likely to vaccinate than those who were not. Researchers have reported conflicting results, probably because they recruited different samples, used different measures, and conducted research in countries with different perceptions of infectious disease risk. Therefore, more research is needed to better understand the effect of sociodemographic characteristics on travelers' perceptions of travel vaccination. In addition, valid and reliable measures are needed to compare different societies in terms of their attitudes toward travel vaccination.

Our findings are consistent with and add to the literature. Travel counseling and travel vaccination are essential to protect and maintain public health. Therefore, public authorities should educate the scientific community about travel counseling and vaccination. Healthcare professionals should develop interventions to increase public awareness of travel medicine and immunization. The Turkish Ministry of Health should broadcast public service announcements about travel immunization. Public institutions should work together to inform the public about the effectiveness of vaccines. Researchers should investigate whether travel and vaccine counseling helps increase vaccination rates among academics. Researchers should also develop valid and reliable measures to assess knowledge, awareness, and practice of travel vaccination among academics.

This is the first study to investigate the knowledge, awareness, and practice of travel vaccination among Turkish academics. Our results suggest that Turkish academics, who are more educated than the general population, do not know much about travel vaccination, travel medicine, and travel advice. Therefore, further research on this topic is warranted. Although this study contributed to the literature, it has several limitations. First, the sample consisted of Turkish academics from only one public university. Second, we used a self-developed data collection tool because there is no valid and reliable measure in the literature. Third, the data were collected online and based on self-report. Fourth, the COVID-19 pandemic may have influenced Turkish academics' perception of travel vaccination. Fifth, the results are sample-specific and cannot be generalized to the whole population. It is thought that it would be important to repeat the research in different academic communities and/or different geographical regions.

Considering the importance of travel counseling and pre-travel vaccination practices in protecting health, preventing diseases, and maintaining public health, we should raise academics' awareness of travel health and counseling and inform them about travel vaccinations.

5. Conclusion

This study focused on the knowledge, awareness, and practice of travel vaccination among Turkish academicians. Four out of five academicians have traveled abroad (82.7%). Three out of five academics travel abroad at least once a year (62.1%). Four out of five academics believe that travel vaccinations are important (85.6%). Almost none of the academics receive health (93.4%) and vaccination advice (94.7%) before traveling abroad.

Two out of five academics receive the vaccines the destination country requires (44.4%). These results suggest that Turkish academics do not have adequate knowledge, awareness, and practice regarding travel vaccinations.

Ethical Considerations

Compliance with ethical guidelines

The study was approved by the ethics committee of [Artvin Çoruh University](#) (Code: E-18457941-050.99-38106 & Date: 02.02.2022). Permission was obtained from the university (No.: E-12475423-605.99-38777, Date: 08.02.202). All academics were briefed on the research purpose and procedure. Informed consent was obtained from those who agreed to participate. The research was carried out according to the ethical principles of the World Medical Association's Declaration of Helsinki.

Funding

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions

All authors equally contributed to preparing this article

Conflict of interest

The authors declared no conflicts of interests.

Acknowledgements

The authors would like to express their gratitude to the research participants.

References

- [1] Akodu BA, Ogbu FO, Abiola AO. Knowledge, attitude and compliance towards travel vaccines among Nigerian travellers at an international airport. *Afr J Prim Health Care Fam Med.* 2019; 11(1):e1-9. [DOI:10.4102/phcfm.v11i1.2063] [PMID] [PMCID]
- [2] United Nations World Tourism Organization (UNWTO). Global and regional tourism performance. Madrid: UNWTO; 2023. [Link]
- [3] Gülen TA. [Pre-travel medical evaluation (Turkish)]. *Türkiye Klinikleri J Inf Dis-Special Topics.* 2017; 10(3):274-82. [Link]
- [4] Angelin M, Evengård B, Palmgren H. Travel health advice: Benefits, compliance, and outcome. *Scand J Infect Dis.* 2014; 46(6):447-53. [DOI:10.3109/00365548.2014.896030] [PMID]

- [5] Kogelman L, Barnett ED, Chen LH, Quinn E, Yanni E, Wilson ME, et al. Knowledge, attitudes, and practices of US practitioners who provide pre-travel advice. *J Travel Med.* 2014; 21(2):104-14. [DOI:10.1111/jtm.12097] [PMID]
- [6] Abouee-Mehrzi A. A national survey of Iranian academicians' attitudes towards COVID-19 vaccination. *Caspian J Health Res.* 2021; 6(1):21-8. [DOI:10.32598/CJHR.6.1.334.1]
- [7] Kamkankaew P, Charoensok K, Phattarowas V, Limpiaongkhanan P, Chongyosying C, Sribenjachot S, et al. How does the risk perception of COVID-19 affect Thai consumers' travel intention? *Romphruek J.* 2021; 39(2):11-38. [Link]
- [8] Heywood AE, Nothdurft H, Tessier D, Moodley M, Rombo L, Marano C, et al. Pre-travel advice, attitudes and hepatitis A and B vaccination rates among travellers from seven countries. *J Travel Med.* 2016; 24(1):taw069. [DOI:10.1093/jtm/taw069] [PMID] [PMCID]
- [9] Yıldız S. [Being a female academician in Turkey (Turkish)]. *Yükseköğretim ve Bilim Dergisi.* 2018; (1):29-40. [Link]
- [10] Bandali M, Schultz J, Than K, McGregor D, Archuleta S, Chadalawada S, et al. Ensuring the safety of yellow fever vaccination in travelers-The experience at a large U.S. Academic Medical Center in Colorado. *Trop Med Infect Dis.* 2020; 5(3):125. [DOI:10.3390/tropicalmed5030125] [PMID] [PMCID]
- [11] Chan W, Shim HH, Ng SC; Asia-Pacific Crohn's and Colitis Epidemiologic Study (ACCESS) Study Group; Liu J, Inglis C, et al. A global survey of gastroenterologists' travel advice to patients with inflammatory bowel disease on immunosuppressive agents and management of those visiting tuberculosis-endemic areas. *J Crohns Colitis.* 2018; 12(11):1261-9. [DOI:10.1093/ecco-jcc/ijy110] [PMID]
- [12] Costa M, Oberholzer-Riss M, Hatz C, Steffen R, Puhan M, Schlagenhauf P. Pre-travel health advice guidelines for humanitarian workers: A systematic review. *Travel Med Infect Dis.* 2015; 13(6):449-65. [DOI:10.1016/j.tmaid.2015.11.006] [PMID]
- [13] Hamer DH, Connor BA. Travel health knowledge, attitudes and practices among United States travelers. *J Travel Med.* 2004; 11(1):23-6. [DOI:10.2310/7060.2004.13577] [PMID]
- [14] Selcuk EB, Kayabas U, Binbasioglu H, Otlu B, Bayindir Y, Bozdogan B, et al. Travel health attitudes among Turkish business travellers to African countries. *Travel Med Infect Dis.* 2016; 14(6):614-620. [DOI:10.1016/j.tmaid.2016.09.005] [PMID]
- [15] Ural A, Kiliç İ. [Scientific research process and data analysis with SPSS (Turkish)]. In: Akbaba A, Lorcu F, Yazıcı Yılmaz ÜS, editors. *TURİZM VE BİLİMSEL ARAŞTIRMA YÖNTEMLERİ.* 2005. [Link]
- [16] Karagöz Y. [SPSS-AMOS-META applied statistical analysis (Turkish)]. Ankara: Nobel Yayıncılık; 2019. [Link]
- [17] Davis LL. Instrument review: Getting the most from a panel of experts. *Appl Nurs Res.* 1992; 5(4):194-7. [DOI:10.1016/S0897-1897(05)80008-4]
- [18] Zhang M, Zhang J, Hao Y, Fan Z, Li L, Li Y, et al. Vaccination knowledge, attitude and practice among Chinese travelers who visit travel clinics in Preparation for international travel. *J Travel Med.* 2016; 23(6):taw051. [DOI:10.1093/jtm/taw051] [PMID]
- [19] Farnham A, Ziegler S, Blanke U, Stone E, Hatz C, Puhan MA. Does the DOSPERT scale predict risk-taking behaviour during travel? A study using smartphones. *J Travel Med.* 2018; 25(1). [DOI:10.1093/jtm/tay064] [PMID]
- [20] Pizam A, Jeong GH, Reichel A, van Boemmel H, Hermann, Lusso JM, et al. The relationship between risk-taking, sensation-seeking, and the tourist behavior of young adults: A cross-cultural study. *J Travel Res.* 2004; 42(3):251-60. [DOI:10.1177/0047287503258837]
- [21] WHO. International travel and health. Geneva: WHO; 2012. [Link]
- [22] Ministry of Health. Travel Health Handbook [Turkish]. Ankara: Ministry of Health; 2023. [Link]
- [23] Brunette GW. Planning for healthy travel: Responsibilities & resources. In: Brunette G, editor. *CDC Health Information for International Travel: The Yellow Book 2014.* Oxford: Oxford University Press; 2013. [Link]
- [24] Suess C, Maddock J, Dogru T, Mody M, Lee S. Using the Health Belief Model to examine travelers' willingness to vaccinate and support for vaccination requirements prior to travel. *Tour Manag.* 2022; 88:104405. [DOI:10.1016/j.tourman.2021.104405] [PMID] [PMCID]
- [25] Pedersini R, Marano C, De Moerlooze L, Chen L, Vietri J. HAV & HBV vaccination among travellers participating in the national health and wellness survey in five European countries. *Travel Med Infect Dis.* 2016; 14(3):221-32. [DOI:10.1016/j.tmaid.2016.03.008] [PMID]
- [26] Aw B, Boraston S, Botten D, Cherniwchan D, Fazal H, Kelton T, et al. Travel medicine: What's involved? When to refer? *Can Fam Physician.* 2014; 60(12):1091-103. [Link]
- [27] WHO. Global Vaccine Action Plan. Geneva: WHO; 2012. [Link]
- [28] Pavli A, Silvestros C, Patrinos S, Maltezou HC. Vaccination and malaria prophylaxis among Greek international travelers to Asian destinations. *J Infect Public Health.* 2015; 8(1):47-54. [DOI:10.1016/j.jiph.2014.07.002] [PMID] [PMCID]
- [29] Bravo C, Castells VB, Zietek-Gutsch S, Bodin PA, Molony C, Frühwein M. Using social media listening and data mining to understand travellers' perspectives on travel disease risks and vaccine-related attitudes and behaviours. *J Travel Med.* 2022; 29(2):taac009. [DOI:10.1093/jtm/taac009] [PMID] [PMCID]
- [30] Poulos C, Curran D, Anastassopoulou A, De Moerlooze L. German travelers' preferences for travel vaccines assessed by a discrete choice experiment. *Vaccine.* 2018; 36(7):969-78. [DOI:10.1016/j.vaccine.2018.01.004] [PMID]
- [31] Heywood AE, Zhang M, MacIntyre CR, Seale H. Travel risk behaviours and uptake of pre-travel health preventions by university students in Australia. *BMC Infect Dis.* 2012; 12:43. [DOI:10.1186/1471-2334-12-43] [PMID] [PMCID]
- [32] Weber R, Schlagenhauf P, Amsler L, Steffen R. Knowledge, attitudes and practices of business travelers regarding malaria risk and prevention. *J Travel Med.* 2003; 10(4):219-24. [DOI:10.2310/7060.2003.40574] [PMID]
- [33] McArthur DB. Emerging infectious diseases. *Nurs Clin North Am.* 2019; 54(2):297-311. [DOI:10.1016/j.cnur.2019.02.006] [PMID] [PMCID]



- [34] Alqahtani AS, Wiley KE, Tashani M, Willaby HW, Heywood AE, BinDhim NF, et al. Exploring barriers to and facilitators of preventive measures against infectious diseases among Australian Hajj pilgrims: cross-sectional studies before and after Hajj. *Int J Infect Dis.* 2016; 47:53-9. [DOI:10.1016/j.ijid.2016.02.005] [PMID] [PMCID]
- [35] Wang J, Liu-Lastres B, Ritchie BW, Mills DJ. Travellers' self-protections against health risks: An application of the full protection motivation theory. *Ann Tour Res.* 2019; 78:102743. [DOI:10.1016/j.annals.2019.102743]
- [36] Hassan ZI, Afolaranmi TO. The knowledge and uptake of travel vaccine among medical doctors in a tertiary health institution in Plateau State, North Central Nigeria. *Indian J Community Med.* 2015; 40(3):177-81. [DOI:10.4103/0970-0218.158861] [PMID] [PMCID]

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